Public Utility Commission of Texas

Project No. 26055

Demand-side Resources and Price Responsiveness

Market Oversight Division Report

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Demand-side Resources and Price Responsiveness Project

Market Oversight Division Staff Report

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I - Background

On March 15, 2002, the Market Oversight Division issued a Request for Cost Estimates to several consulting companies to conduct a study of demand-side resources and price responsiveness in the ERCOT Market. In May 2002, MOD retained a third party independent consultant, Laurits R.Christensen Associates, Inc., (the Consultant) to review the existing market rules and make recommendations for rule modifications and programs so as to increase the participation of load resources in the Balancing Energy market and the Ancillary Services markets. The project's major events were as follows:

May 31:	Phone conference between Staff and Consultant initiating the project.
June 03:	Staff meeting with the Demand-Side Working Group (DSWG) at ERCOT. Consultant joins through phone line and gives a presentation on the scope of the project.
June 31:	Consultant submits an Interim Memorandum where he provides an outline for his report and recommendations
July 08 :	Consultant travels to Austin to hold meetings with MOD team and with the DSWG at ERCOT. Market Participants are invited to send comments on Interim Memorandum
July 11 :	Phone conference between Staff and Consultant to further discuss Interim Memorandum and feedback received from DSWG members.
Aug. 01:	Consultant provides Draft Report with recommendations. Staff provides feedback on Draft Report.
Aug. 19:	Phone conference between Staff and Consultant to discuss Draft Report recommendations.
Aug. 31:	Consultant provides Final Report.
Sep. 24 :	Staff meets with DSWG members to discuss the report recommendations. DSWG members are invited to follow-up by e-mailing their written comments to Staff.

The Consultant's Final Report includes a theoretical discussion of Demand Response and its benefits in electric markets; an overview of other ISO Demand Response programs; a discussion of barriers to demand-side participation in ERCOT markets; and a recommendation section. In this report, Staff presents and analyzes the Consultant's recommendations. In addition, Staff presents its own recommendations.

II - Report Recommendations

The report provides three types of recommendations: short term (S), intermediate (I) and long term (L). When discussing the Consultant's recommendations with the DSWG members, Staff attempted to assess:

- How well each recommendation applies to the ERCOT market
- How each recommendation could be practically implemented
- What potential for gaming each recommendation may present
- What impact each recommendation may have on the reliability of the system
- What budgetary impact each recommendation may have

Staff used the feedback received from the DSWG members to prepare this analysis of the Consultant's recommendations.

1. Consultant Short-term Recommendations

Consultant Recommendation S-1:

Select a Standard Method for Measuring the "Baseline Loads" of Curtailed Customers

Texas should therefore undertake a modest-sized study that compares the accuracy of different methods of predicting baseline loads; and based upon the results of this study, Texas should pick a method that can be uniformly applied to all curtailable customers.

A baseline must be developed for each curtailable customer to calculate the amount of load curtailed, or in other words the amount the customer would have consumed in the absence of the curtailment.

1. Large Loads

The DSWG has developed a method for measuring the baseline loads for large loads qualifying as Balancing Up Loads (BULs.) Staff and the DSWG agree that:

- The method is consistent with baseline load calculation methods used in other ISOs and reflects the experience accumulated in those areas.
- The method is easy to implement and will work well in the ERCOT market.
- The method provides reliable results and it does not appears that it can be gamed.

Therefore, the parties do not feel that spending resources in a study such as is suggested by the consultant is warranted at this point.

However, some DSWG members are concerned that, although a baseline methodology has been proposed for BULs, no baseline approach has been agreed upon for Loads Acting as a Resource (LaaRs) and participating in the day-ahead capacity reserve market. More specifically, ERCOT does not rely on an estimated baseline to determine load response in the Responsive Reserve Market, the only Ancillary Services market in which loads are currently participating. Instead, ERCOT relies on telemetry that allows it to monitor the load level every two seconds, and the baseline is the load observed one minute prior to the start of a frequency excursion (i.e. one minute before ERCOT's curtailment deployment.) ERCOT measures and records the load level during the ten minutes following the deployment to verify that load resources are performing in the desired manner (Protocols Section 6.10.5.4.) While this method fits stable loads well, it does not work for loads that have a tendency to be highly variable such as steel loads.

Based on the discussion with the DSWG members, Staff believes that the baseline methodology proposed for BULs can be applied to LaaRs in Ancillary Services markets that do not require an instantaneous response, i.e. the Non-spinning Reserve and Replacement Reserve markets. ERCOT should have the software in place for loads to participate in these markets in October 2002. A methodology for determining how much Responsive Reserves can be bid by fluctuating loads, and whether the loads are performing in an acceptable manner is still needed. Staff has not heard any practical suggestion for such a methodology, but will continue to explore possibilities with the DSWG members and with ERCOT.

Staff Recommendation 1-a:

- The baseline methodology currently proposed for BULs should be adopted and implemented as soon as ERCOT has the operating capability to accept BULs' participation in the Balancing Energy market.[1]
- The baseline methodology proposed for BULs should be adopted to allow participation in the Non-spinning and Replacement Reserve markets and to qualify fluctuating loads as LaaRs for these two markets.
- ERCOT should explain in a report to the Commission whether participation by fluctuating loads such as steel loads in the Responsive Reserve market presents a reliability problem and why.

2. Small Loads

Two methodologies for developing a baseline for small loads participating in a Direct Load Control (DLC) program are currently being evaluated by the Profiling Working Group (PWG). Once the PWG decides on the best methodology, several time-consuming steps will be needed and a budget will have to be approved by ERCOT before it can be implemented. The earliest date when a load profile for DLC customers would be available is currently estimated to be mid-summer 2003. A DLC program is in place and ready to be implemented in the Houston zone but delays in completing the necessary DLC customer profile may realistically postpone implementation to the Summer of 2004. It is important to provide the current market players who are ready to activate the DLC program in the Houston zone the means to do so. Prolonged delays could make it uneconomical for these players to continue with the program.

[1] ERCOT anticipates that it will have the capability to accept BUL bids by June 2003.

Staff Recommendation 1-b:

- Commission Staff needs to play a more active role in encouraging quick adoption by the PWG of a methodology for developing DLC customer load profiles.
- ERCOT should give high priority to the DLC customer profiling project once a methodology has been adopted.

Consultant Recommendation S-2:

Survey Customers, REPs and QSEs on BUL and LaaR on their Demand Response Program Participation Decisions

It would be useful to:

gain insights as to why customers are not participating to a greater extent (in the Laars and BULs programs) and what incentives and disincentives are perceived by the QSEs and REPs in recruiting customers for participation

survey customers on their desire for passive load response opportunities such as real-time pricing and critical price time-of-use pricing

survey REPs on their perceived incentives and disincentives for offering dynamic pricing products to retail customers

survey those retail customers who were on dynamic pricing and interruptible rates prior to markets opening.

Staff and DSWG members fully agree with this recommendation and discussed its practical implementation and least budgetary impact.

Staff Recommendation 2:

- Staff should, with input from the DSWG, design a survey targeting retail customers on dynamic pricing and interruptible rates prior to market open and a survey targeting REPs and QSEs.[2]
- Staff should administer the surveys using available lists of REPs and QSEs and a list of customers compiled by DSWG members.
- Staff should compile and report the results and develop recommendations based on the survey results.
- Alternatively, if a budget becomes available in a reasonable time frame, a local consultant could be hired to administer more comprehensive surveys and report the results.

[2] The scope of the surveys would be limited and the format would be multiple choice for ease of administration.

- A survey of smaller customers would require more resources. Staff recommends that the Commission consider administering such a survey as part of the customer education campaign funded by the System Benefit Fund.

Consultant Recommendation S-3:

Develop Pilot Curtailment Programs

We suggest that Texas develop bid-based curtailment programs for those load pockets in which it believes it has the greatest need for load relief.

The Consultant suggested two possible types of programs, both modeled after ISO programs implemented in the New York, New England and PJM ISOs. Both types of programs would be bid-based, would guarantee a reserve payment to participating loads for being available for curtailment upon receipt of a signal from ERCOT, and would be administered by the QSE or the REP. If deployed, a customer would receive an energy payment based on its bid. Curtailment costs would be uplifted to customers in the load pocket or in the zone rather than ERCOT wide.

Such a program could have high benefits in the DFW area, the most constrained load pocket in ERCOT and second in size only to the NY City load pocket in the country. The details on how such a program would work would have to be developed with input from REPs and/or QSEs as well as from ERCOT.

The program would have to be coordinated with load curtailment programs that may be implemented by TDSPs under the Energy Efficiency Rule. Additionally, an analysis would have to be done to ensure that such a program does not conflict or compete with participation in the LaaRs and BULs programs as those become more available.

Staff Recommendation 3:

- Staff should assess the annual congestion relief costs for the DFW area using ERCOT data for summer 2002 and summer 2003, and estimate the cost savings that would be made possible by such a program.
- PUC or ERCOT Staff should monitor the impact of naturally occurring load participation in the BUL market as it develops as well as in the bilateral market, and of passive load response in the DFW area over the summer of 2003. The impact of any load curtailment program sponsored by TDSPs should also be monitored.
- Based on the results of these two activities, Staff should develop a recommendation on whether and how to proceed with a curtailment program as recommended by the Consultant.

Consultant Recommendation S-4:

Develop Benchmarks of the Benefits of Demand Response Programs

- *requires methods for estimating and forecasting the locational marginal costs of energy and ancillary services*
- *develop marginal cost-based benchmarks of the benefits of demand response programs*
- *consistent benchmarks can be applied to all demand response programs. These benchmarks would be differentiated by the locations and time periods of each demand response program*

Developing benchmarks of benefits before a program has been implemented requires making assumptions that may make the results unreliable. The approach recommended by Staff under the previous item may be used as a basis for implementing a pilot program. During the pilot, actual program benefit data is collected and used to develop benchmark benefits such as the Consultant is recommending.

Staff Recommendation 4:

- Postpone implementation of Consultant recommendation S-4 until a pilot program has been implemented.

Consultant Recommendation S-5:

Evaluate Metering Policy

- *metering policy (should) be re-evaluated in light of Texas' significant market changes*
- *benefit-cost analysis can indicate the customer types and conditions under which expanded interval metering of individual customers is warranted*
- *A separate benefit-cost analysis can indicate the conditions under which meters should be installed for the purpose of sampling customer loads*.

The need to evaluate or re-evaluate metering policy in light of significant market changes exists, but Staff notes that Market Participants disagree in their assessment of the benefit to the consumer of competitive metering and no consensus assessment has emerged to guide Staff's recommendations.

Regarding the second point, Staff notes that in some areas, such as the Houston area previously served by HL&P, a portion of customers under 1 MW have advanced meters. It will be interesting to see whether REPs serving these customers offer them time differentiated pricing options. These customers and the REPs that serve them may constitute a test case for determining if advanced meter installations should be expanded to promote such options. Additionally, the need for meters should be gauged through the results of the REP survey recommended in S-2.

Regarding the third point, The PWG is currently in the process of evaluating a methodology that will involve the installation of meters for the purpose of sampling and developing a load profile for DLC customers, as I have indicated under Recommendation S-1. The group will provide a cost estimate for the project, and if approved by the ERCOT Board, ERCOT will issue an RFP to procure the metering equipment.

Staff Recommendation 5:

- Postpone implementation of a cost benefit analysis of expending advanced meter installations until REPs' assessment of the need for expanding advanced meters is known through the survey responses.
- Monitor REPs' offerings of time differentiated pricing options to customers under 1 MW who already have advanced meters installed.
- Monitor the progresses of the PWG evaluation of the sampling project for DLC customers.

Consultant Recommendation S-5:

Improve the BUL and LaaR Document

it would be useful for ERCOT to dedicate some staff resources to reviewing and revising the protocols regarding BULs and LaaRs

The document known as "The Plain English Guide to BULs and LaaRs"[3] was developed by members of the DSWG who put considerable effort into it. This document attempts to explain in simple terms a very complicated certification process and settlement system. Staff believes that it may be very useful for ERCOT to use this document as a base to provide training classes to loads and REPs who may be interested in participating in the BULs and LaaRs programs.

Staff Recommendation 5:

- ERCOT should review and sign off on "The Plain English Guide to BULs and LaaRs" document, and should assign staff resources to keep it updated. ERCOT should place this document on its website.
- ERCOT should use the document as a base to offer training classes to interested customers and REPs.

Consultant Recommendation S-6:

Require Each Resource to Pay Its Own Overhead Costs

Each load or generator resource that wants to participate in ERCOT's markets should pay for the metering, communication, and control costs necessary to allow their market participation

[3] Also known by some as "BULs and LaaRs For Dummies".

The fact that these costs are relatively high for small consumers means that it is generally not efficient for such consumers to participate in certain markets

Staff believes that the determination regarding payment for overhead costs of demand response programs should be based on economic facts and sees a contradiction between this recommendation and Consultant Recommendations S-4 (Develop Benchmarks of the Benefits of Demand Response Programs), and S-5 (Evaluate Metering Policy.) In particular, Staff sees a discrepancy between the second point made under this recommendation and the previous recommendations to conduct cost-benefit analyses of programs. Staff believes that program costs must be evaluated relative to the program benefits. Thus the cost of a program for small customers should be evaluated relative to the benefits of that program rather than relative to the cost of a program for large customers.

Staff Recommendation 6:

- Do not adopt Consultant Recommendation S-6 as a blanket principle. Instead, evaluate the costs and benefits on a program by program basis.

Consultant Recommendation S-7:

Evaluate the Benefits and Costs of Our Long-Term Recommendations

we suggest that Texas adopt an efficient pricing system that includes centralized day-ahead and real-time markets, three-part bidding, and locational pricing. Texas may wish to conduct a study that examines this question

Part of this study could address the comparative net benefits of ERCOT organized and operated energy markets versus private organization and operation

The Commission is in the process of evaluating different market designs, including the features included by the Consultant in his long term recommendations, through discussions with market design experts, the review of specialized papers, and by holding public workshops.

Staff Recommendation 7

- Given the activities described above, expanding additional resources in a study that examines market design issues is not warranted.

Additional Staff Recommendations

Staff has four short term recommendations in addition to the seven short term recommendations submitted by the Consultant.

Staff Recommendation 8:

- Using the "Plain English Guide for BULs and LaaRs" document, ERCOT should offer training classes to interested customers and REPs.

We believe that ERCOT should conduct training sessions for customers and REPs who are potential participants in the ERCOT market load resource programs or as passive loads. As the Consultant pointed out under Consultant Recommendation S-6, the certification process and the settlement system are complicated and may constitute a barrier to participation.

Staff Recommendation 9:

- ERCOT should take steps to include a demand-side expert on its staff.

Secondly, Staff believes that ERCOT should have a demand-side expert on its staff. ERCOT staff members collectively have extensive professional backgrounds in the electric generation/transmission industry and they understand well the operating needs of generators and transmission providers. A demand-side professional would be a valuable addition to the ERCOT staff and would provide the bridge necessary for ERCOT to communicate with load resources. Among other duties, he or she would be well positioned to maintain and update the "Plain English Guide for BULs and LaaRs" document, conduct training classes for customers and REPs, attend the meetings of the DSWG, and be a client representative for QSEs who schedule for load clients.

Staff Recommendation 10:

- Develop the necessary Protocol changes so that providers of LaaRs and BULs may schedule their load resources through a REP/QSE other than the REP/QSE with whom they have a supply contract.

Thirdly, an important barrier to load participation in the ERCOT-run Ancillary Services market is due to the requirement that the REP/QSE of a customer should also be the REP/QSE that schedules the load the customer offers as a resource in the ERCOT-run markets. If a customer happens to have signed a contract with a REP/QSE who is not up to speed on LaaRs and BULs, the customer does not have the option to participate in those markets. A customer generally chooses a REP primarily as a function of the options and benefits offered in the supply package he is able to negotiate. ERCOT stakeholders should reconsider the requirement that a customer be tied to his supplying REP to also handle his load resource needs and a discussion should be initiated to assess the necessary changes to the Protocols.

Staff Recommendation 11:

- Either DSWG members or Staff in consultation with the DSWG should submit a PRR to clarify Protocol language regarding the ability of loads to deviate from the load schedule without violating the Protocols under the Relaxed Balanced Schedule provision.

DSWG members have requested that the Commission clarify that under the Relaxed Balanced Schedule to be implemented on November 1, 2002 (if approved by the ERCOT board,) loads that wish to passively respond to balancing energy prices can do so without penalty.

The Protocol language as submitted in PRR 360, the Relaxed Balanced Schedule Protocol Revision Requirement, specifies: "A relaxed Balanced Schedule may be created by projecting interval Supply and setting aggregate Obligations equal to aggregate Supply." This language is intended to indicate that the projected interval Supply scheduled by a QSE should be accurate, but that the scheduled Load Obligations should be set simply to match the generation schedule. Since this language is perceived as insufficient to allow loads to deviate from the load schedule, the DSWG members should either submit a comment to amend the language of PRR360, or should submit a PRR of their own to clarify the language to their satisfaction.

Staff agrees that under the current Protocols, extensive deviations from schedules by load responding to price signals are considered a violation even though no penalty is envisioned under the Protocols. Staff believes that this barrier to passive load participation will be eliminated with ERCOT's approval of PRR 360.

2 – Consultant's Intermediate Recommendations

Consultant Recommendation I-1

Develop Non-Discriminatory Measures of Performance

ERCOT needs an objective method for quantifying the relative values of resources according to their performance

All resources – generators and loads – should have their effective quantities measured according to exactly the same rules

The DSWG members agree that the measurement shortfall identified by the Consultant in this recommendation is at the core of the problem for certain loads to be able to participate in the Ancillary Services market. However, this recommendation does not bring a practical solution to the problem. No proposal has been made for a reasonable measure of baseline load that would allow fluctuating loads to participate in the Responsive Reserves Market. In addition, Staff agrees with TIEC and ERCOT that an accurate and standardized measurement of resources, including generators and loads, is needed at either the REP or the QSE level because it is at that level, and not at ERCOT level, that there is a need to identify the contribution of each resource.

The Consultant further proposes that ERCOT stop measuring the performance of a single QSE who may over- or undersupply relative to his resource commitment and instead take into consideration the aggregate performance of all QSEs. The argument is that, in the aggregate, the QSEs over- and undersupplying would balance each other out. Thus measuring performance at the ERCOT level rather than at the QSE level would give individual QSEs more incentive to accept loads with variable performances in their portfolio of resources.

Staff is strongly opposed to this proposal. Measuring performance at the ERCOT level rather than at the QSE level would be an open invitation to gaming and would create a serious reliability problem. Staff has observed this kind of gaming activities whereby a QSE bids resources in the Ancillary Services market but is unable to deliver when ERCOT attempts to deploy the committed resources. Under the current Protocols, a QSE's deliberate failure to perform can be detected, whereas under the Consultant's proposal to measure performance at the ERCOT level, it could not.

3 – Consultant's Long Term Recommendations

Consultant Recommendations L-1 through L-6

The Consultant submitted six long term market design recommendations listed below. Market design issues are currently being debated in ERCOT in a broader context than the demand response project allows. Although in theory these market design features should facilitate load participation because they allow for better price signals to load, we have observed in markets that have these market design features, that they are not sufficient to ensure load participation. The New York ISO, the New England ISO, PJM and California have expanded significant efforts and developed different types of programs to facilitate load participation, with limited results according to the Consultant's Report. In addition, the bilateral market structure ERCOT has adopted offers opportunities for loads to participate actively in the market through bilateral agreements and we have observed that several large customers are already taking advantage of these opportunities. Staff does not have recommendations regarding these market design features as we believe that they must be evaluated in a broader context than this project allows.

L-1: Develop Transparent Day-Ahead Electricity Markets

A day-ahead market would probably stimulate additional demand response. Customers and market participants would have another option in addition to bilateral contracts for contracting for power. This market design feature will be addressed at the Commission's December 2 Public Worshop on Market Design.

L-2: Develop Transparent Same-Day Electricity Markets

The same remarks as in L-1 above hold for this design feature.

L-3: Consider Adopting Three-Part Bidding

Under the current market design, this proposal does not appear to be implementable within the context of portfolio bidding and 15 minute deployments in the Balancing Energy Market. In addition, it may not be necessary since ERCOT constructs multiple bid point curves.

L-4: Consider Adopting Efficient Locational Pricing of Electrical Energy

MOD has been very actively developing a proposal to resolve the locational pricing issue. Another option is to abandon the current zonal model and adopt a nodal model. This fundamental change in market design cannot be decided solely on account of load participation, especially since, as I have pointed out, other ISOs who have implemented a nodal system are still having to expend considerable efforts to facilitate load participation. This and other market structures will be addressed at the Commission's January Public Workshop on Market Design.

L -5: Apply Market-Clearing Prices to All Resources' Effective Quantities

This recommendation is similar to the Consultant's Recommendation I-1.

L-6: Set Penalties for Non-Performance Equal to the Costs of Non-Performance

Staff believes and several DSWG members agree that, where ERCOT is counting on resources for reliability services, there should be a reasonably sized penalty in addition to the cost of replacement service to deter gaming practices harmful to the market. Staff however agrees that penalties for non-performing loads should not be so large as to discourage participation, as has happened in California.